

1 1. (UNCHANGED) An integrated circuit package comprising:  
2 an integrated circuit having sense inputs for a sensed tip signal and a  
3 sensed ring signal of a subscriber loop, wherein the integrated circuit generates a  
4 subscriber loop linefeed driver control signal in response to the sensed signals,  
5 wherein the linefeed driver does not reside within a same integrated circuit.

1 2. (UNCHANGED) The integrated circuit package of claim 1 wherein the sensed  
2 tip signal includes first and second sampled tip voltages, wherein a difference  
3 between the first and second sampled tip voltages is proportional to the tip  
4 current, wherein the sensed ring signal includes first and second sampled ring  
5 voltages, wherein a difference between the first and second sampled ring  
6 voltages is proportional to the ring current.

1 3. (UNCHANGED) The integrated circuit package of claim 1 wherein the  
2 integrated circuit is a complementary metal oxide semiconductor (CMOS)  
3 integrated circuit.

1 4. (UNCHANGED) A subscriber loop linefeed driver comprising:  
2 power circuitry for providing battery feed to a ring node and a tip node of  
3 a subscriber loop in accordance with a linefeed control signal; and  
4 sense circuitry providing a sensed tip signal and a sensed ring signal,  
5 wherein the sensed tip and ring signals correspond to a tip current and a ring  
6 current of the subscriber loop.

1 5. (UNCHANGED) The subscriber loop linefeed driver of claim 4 wherein the  
2 sense circuitry comprises:

3 a tip resistor series-coupled to the tip node and the power circuitry;

4 a pair of tip sampling resistors one end of each tip sampling resistor  
5 connected to opposite ends of the tip resistor, the other end of each tip sampling  
6 resistor forming a tip sense node;

7 a ring resistor series-coupled to the ring node and the power circuitry;

8 a pair of ring sampling resistors one end of each ring sampling resistor  
9 connected to opposite ends of the ring resistor, the other end of each ring  
10 sampling resistor forming a ring sense node.

1 6. (UNCHANGED) The subscriber loop linefeed driver of claim 4 wherein the  
2 sensed tip signal comprises first and second sampled tip voltages, wherein a  
3 difference between the first and second sampled tip voltages is proportional to  
4 the tip current, wherein the sensed ring signal includes first and second sampled  
5 ring voltages, wherein a difference between the first and second sampled ring  
6 voltages is proportional to the ring current.

1 7. (UNCHANGED) The subscriber loop linefeed driver of claim 4 wherein the  
2 power circuitry comprises:

3 a tip control circuit, wherein the tip control circuit increases a tip node  
4 voltage in response to a first tip control signal, wherein the tip control circuit  
5 decreases a tip node voltage in response to a second tip control signal; and

6 a ring control circuit wherein the ring control circuit increases a ring node  
7 voltage in response to a first ring control signal, wherein the ring control circuit  
8 decreases a ring node voltage in response to a second ring control signal.

1 8. (UNCHANGED) The subscriber loop linefeed driver of claim 7 wherein the tip  
2 control circuit comprises:

3 a first transistor of a first type having an emitter coupled to receive the  
4 first tip control signal;

5 a second transistor of the first type having an emitter coupled to receive  
6 the second tip control signal, wherein a base of each of the first and second  
7 transistors is coupled to first node;

8 a third transistor of a second type having a collector coupled to a collector  
9 of the first transistor and an emitter coupled to a second node;

10 a resistor having a first end coupled to the second node, a second end of  
11 the resistor coupled to a base of the third transistor and a collector of the second  
12 transistor.

1 9. (UNCHANGED) The subscriber loop linefeed driver of claim 8 wherein the  
2 first type is a PNP bipolar junction transistor, wherein the second type is an NPN  
3 bipolar junction transistor.

1 10. (UNCHANGED) The subscriber loop linefeed driver of claim 4 further  
2 comprising:

3 voiceband circuitry for bi-directional communication of voiceband data  
4 between the ring and tip nodes and a voiceband data interface, wherein the

5 voiceband circuitry provides the analog voiceband data interface with d.c.  
6 isolation from the ring and tip nodes.

1 11. (UNCHANGED) The apparatus of claim 10 wherein the voiceband  
2 circuitry further comprises:  
3 a first voiceband data output node;  
4 a load coupled to the first voiceband data output node;  
5 a first voiceband data input node, wherein the load and the first voiceband  
6 data input node are capacitively coupled to a selected one of the tip and ring  
7 nodes.

1 12. (UNCHANGED) The apparatus of claim 4 further comprising  
2 voiceband circuitry for bi-directional communication of voiceband data between  
3 the ring and tip nodes and a voiceband data interface, wherein the voiceband  
4 circuitry further comprises:  
5 a first voiceband data input node capacitively coupled to a selected one of  
6 the ring and tip nodes for receiving voiceband data from the subscriber loop,  
7 wherein voiceband data transmitted to the subscriber loop is superimposed on  
8 the linefeed control signals.

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1 13. (ONCE AMENDED) An apparatus comprising:  
2 an integrated circuit generating subscriber loop control signals in response  
3 to a sensed tip signal and a sensed ring signal of a subscriber loop, the sensed tip  
4 and ring signals received by the integrated circuit; and

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a linefeed driver for driving a subscriber loop in accordance with the  
6 subscriber loop control signals, the linefeed driver providing the sensed tip and  
7 ring signals.

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1 14. (UNCHANGED) The apparatus of claim 13 wherein the integrated  
2 circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit.

1 15. (UNCHANGED) The apparatus of claim 13 wherein the linefeed driver  
2 comprises:  
3 power circuitry for providing battery feed to a ring node and a tip node of  
4 a subscriber loop in accordance with a linefeed control signal; and  
5 sense circuitry providing a sensed tip signal and a sensed ring signal,  
6 wherein the sensed tip and ring signals correspond to a tip current and a ring  
7 current of the subscriber loop.

1 16. (UNCHANGED) The linefeed driver of claim 15 wherein the sense  
2 circuitry comprises:  
3 a tip resistor series-coupled to the tip node and the power circuitry;  
4 a pair of tip sampling resistors one end of each tip sampling resistor  
5 connected to opposite ends of the tip resistor, the other end of each tip sampling  
6 resistor forming a tip sense node;  
7 a ring resistor series-coupled to the ring node and the power circuitry;  
8 a pair of ring sampling resistors one end of each ring sampling resistor  
9 connected to opposite ends of the ring resistor, the other end of each ring  
10 sampling resistor forming a ring sense node.

1 17. (UNCHANGED) The linefeed driver of claim 15 wherein the sensed tip  
2 signal comprises first and second sampled tip voltages, wherein a difference  
3 between the first and second sampled tip voltages is proportional to the tip  
4 current, wherein the sensed ring signal includes first and second sampled ring  
5 voltages, wherein a difference between the first and second sampled ring  
6 voltages is proportional to the ring current.

1 18. (UNCHANGED) The linefeed driver of claim 15 wherein the power  
2 circuitry comprises:  
3 a tip control circuit, wherein the tip control circuit increases a tip node  
4 voltage in response to a first tip control signal, wherein the tip control circuit  
5 decreases a tip node voltage in response to a second tip control signal; and  
6 a ring control circuit wherein the ring control circuit increases a ring node  
7 voltage in response to a first ring control signal, wherein the ring control circuit  
8 decreases a ring node voltage in response to a second ring control signal.

1 19. (UNCHANGED) The linefeed driver of claim 18 wherein the tip control  
2 circuit comprises:  
3 a first transistor of a first type having an emitter coupled to receive the  
4 first tip control signal;  
5 a second transistor of the first type having an emitter coupled to receive  
6 the second tip control signal, wherein a base of each of the first and second  
7 transistors is coupled to first node;

8 a third transistor of a second type having a collector coupled to a collector  
9 of the first transistor and an emitter coupled to a second node; and  
10 a resistor having a first end coupled to the second node, a second end of  
11 the resistor coupled to a base of the third transistor and a collector of the second  
12 transistor.

1 20. (UNCHANGED) The linefeed driver of claim 19 wherein the first type  
2 is a PNP bipolar junction transistor, wherein the second type is an NPN bipolar  
3 junction transistor.

1 21. (UNCHANGED) The linefeed driver of claim 15 further comprising:  
2 voiceband circuitry for bi-directional communication of voiceband data  
3 between the ring and tip nodes and a voiceband data interface, wherein the  
4 voiceband circuitry provides the analog voiceband data interface with d.c.  
5 isolation from the ring and tip nodes.

1 22. (UNCHANGED) The linefeed driver of claim 21 wherein the voiceband  
2 circuitry further comprises:  
3 a first voiceband data output node;  
4 a load coupled to the first voiceband data output node; and  
5 a first voiceband data input node, wherein the load and the first voiceband  
6 data input node are capacitively coupled to a selected one of the tip and ring  
7 nodes.

1 23. (UNCHANGED) The apparatus of claim 15 further comprising  
2 voiceband circuitry for bi-directional communication of voiceband data between  
3 the ring and tip nodes and a voiceband data interface, wherein the voiceband  
4 circuitry further comprises:  
5 a first voiceband data input node capacitively coupled to a selected one of  
6 the ring and tip nodes for receiving voiceband data from the subscriber loop,  
7 wherein voiceband data transmitted to the subscriber loop is superimposed on  
8 the linefeed control signals.